

# Empirical Issues In Measuring The Returns To Female Labor Market Experience

Paul E. Gabriel, Loyola University Chicago, USA  
Susanne Schmitz, Elmhurst College, USA

## ABSTRACT

*This paper assesses the empirical properties of two labor market experience measures for female workers in the United States. Our results confirm that the conventional cross-sectional measure of labor market experience, often referred to as potential experience, is an upwardly-biased estimate of the true labor market experience of women -- since women are more likely to experience periods of intermittent labor force participation. This bias yields inconsistent estimates of the returns to female labor market experience. We also present corrected returns to female labor market experience based on longitudinal work history information.*

**Keywords:** Human Capital; Female Labor Market Experience; Returns to Experience

## 1. INTRODUCTION

According to the standard human capital model of income determination, a worker's current earnings potential can be attributed to two primary factors: 1) accumulated amounts of human capital (skill), reflected in differences in worker productivity and 2) other factors such as choice, labor market shocks, and differential treatment in the labor market. A typical earnings model relates wage and salary earnings as a function of human capital and other characteristics that are empirically linked to earnings. OLS estimation of the coefficients in a parameter vector of these characteristics provides the reduced-form earnings structure which can be used to assess the incremental effects on earnings of each independent variable.

Since Mincer's (1974) initial specification of an operational human capital earnings function, a persistent empirical problem has been how to measure the human capital acquired through labor market experience. Mincer's widely adopted labor market experience variable is frequently referred to as "potential" experience and is calculated as Age – Years of Schooling – 5. The measure implicitly assumes that workers participate continuously in the labor force once they complete their formal schooling. This assumption poses several empirical difficulties. For instance, if certain demographic groups, such as women, experience higher rates of intermittent or part-time labor market activity, potential experience may have limited value as a proxy for their labor market experience. Another difficulty with potential experience is that it imposes an implicit dichotomy between a year of schooling and a year of labor market experience - *ceteris paribus*, an increase in schooling implies a decrease in labor market experience. Given recent work on the labor market effects of part-time work experience acquired during school (Light, 2001), this dichotomy appears overly restrictive. Although researchers have long been aware of the biases with potential experience, the lack of extensive work history information in many data sets has hindered improvements in labor market experience measures.

Recently, several studies have developed alternate labor market experience measures based on longitudinal work history information (see Wood, et. al., 1993; Filer, 1993; Light and Ureta, 1995; Altonji and Blank, 1999; Blau and Kahn, 1997; Gabriel, 2005; and Regan and Oaxaca, 2009). Not surprisingly, the consensus is that more accurate measures of experience result in stronger empirical links between prior labor market activity and a worker's earnings potential. In addition, most researchers report a significant improvement in the ability to account for differences in earnings among various groups of workers (Gabriel, 2005; Regan and Oaxaca, 2009). Although the primary focus of these studies was to develop more robust empirical specifications to compare earnings levels across demographic groups, there are also implicit findings concerning the alternate measures of labor market experience.

As expected, potential labor market experience tends to over-estimate the actual accumulated level of labor market experience of women and other groups who may be prone to extended periods of intermittent labor market participation (Blau and Kahn, 1997). However, direct empirical tests of these differences are seldom reported. This paper explores empirical differences between the potential experience variable and one based on longitudinal work history information. We then assess how these differences affect the estimated returns to female labor market experience.

## 2. DATA

Panel data sets, such as the 1979 Cohort of the National Longitudinal Survey of Youth (NLSY79), allow us to determine a worker's accumulated labor market experience from actual work history data. We selected two years from the NLSY79 for our empirical analysis - 1994 and 2010. We chose 1994 because it represents the last year of continuous work history data collected by the NLSY (since 1994, the survey is conducted biennially); 2010 because it is the most current sample. For each year, we constructed two samples of working women: 1) the *full sample* consists of all non-agricultural wage and salary workers, with the exception of students, military personnel with more than two weeks of active duty service, and those who report work-limiting disabilities and 2) the *year-round full-time sample* consists of workers with at least 1,750 hours of paid labor market activity during the previous calendar year.<sup>1</sup> The second sample was compiled to determine if there are notable differences in experience measures for women who demonstrate stronger labor force attachment.

Our assessment of labor market experience compares *potential experience* (EXP) with *actual experience -- defined as year-round, full-time equivalent years of experience* (YRFTEXP). YRFTEXP equals annual hours worked divided by 1,750 and then summed over each sample year since 1979. With individual data on annual hours worked, YRFTEXP captures the intensity of a worker's labor market activity over time. Although each experience measure is expressed in years, YRFTEXP can be interpreted as year-round, full-time *equivalent* years. For example, if a worker has accumulated 2,100 hours of labor market activity in a year, their corresponding experience is 1.2 year-round, full-time equivalent years. Thus, YRFTEXP is a more continuous measure of labor market experience than EXP, and, unlike potential experience, YRFTEXP accurately reflects periods of labor force inactivity. Our full-time equivalent actual experience variable is comparable to similar measures used by others.<sup>2</sup>

## 3. EMPIRICAL RESULTS

Sample means of the labor market experience measures are presented in Table 1. Because of the change to biennial sampling in 1994, the 2010 EXP variable is adjusted to reflect the eight 'missing' years of annual hours worked data.<sup>3</sup> Table 1 indicates that potential experience (EXP) differs statistically from YRFTEXP at conventional levels for each sample of females and in both sample years. These results are consistent with the notion that EXP *overstates* the true labor market experience of women since they are prone to periods of intermittent labor force participation.

A correlation analysis further underscores the empirical differences between EXP and YRFTEXP. There is a weak, although statistically significant, positive correlation between potential and actual labor market experience for women in 1994 ( $\rho = 0.084$  for all females, and  $\rho = 0.188$  for YRFT women) and there is no correlation in 2010 ( $\rho = -0.017$  for the full sample, and  $\rho = -0.0158$  for YRFT women). These results suggest that in 1994, EXP is a weak statistical approximation for the actual labor market experience of women, and by 2010, EXP provides little or no empirical information on their accumulated work experience. This ageing effect suggests that the biases associated with EXP increase over time.

<sup>1</sup> Our notion of a full-time-equivalent worker is based on the U.S. Department of Labor's definition of year-round full-time: 35 or more hours per week, 50 or more weeks per year (1750 or more hours per year).

<sup>2</sup> Blau and Kahn's (1997) experience measure uses 1500 hours as the full-time equivalent cutoff; Regan and Oaxaca (2009) use 2080 hours (i.e., 40 hrs. per week, 52 weeks per year); Gabriel (2005) uses 1750 hours. In order to minimize outliers we imposed the following constraint: for any given year,  $0 \leq \text{YRFTEXP} \leq 2.0$ .

<sup>3</sup> Since the NLSY79 is now conducted every other year, between 1994 and 2010 there are eight missing years of data on 'annual hours worked in the previous calendar year': 1994, 1996, 1998, 2000, 2002, 2004, 2006, and 2008. Thus, 'adjusted' EXP in 2010 = (Age - Schooling - 5 - 8).

**Table 1: Sample Means 1979 Cohort, National Longitudinal Survey of Youth - Female Workers in 1994 & 2010**

Year	Variable	Full Sample	YRFT Workers
1994	EXP	14.56 <sup>a</sup>	14.38 <sup>a</sup>
	YRFTEXP	12.11	13.26
	Sample size	2273	1616
2010	EXP <sup>b</sup>	21.60 <sup>a</sup>	21.58 <sup>a</sup>
	YRFTEXP	19.10	20.12
	Sample size	2021	1529

Notes: <sup>a</sup> The difference in means between EXP and YRFTEXP is statistically significant at the 1% level. <sup>b</sup> 'Adjusted' EXP for 2010 = Age – Schooling -13

The results in Table 1, along with the correlation analysis, indicate that the standard cross-sectional proxy for labor market experience (EXP) is statistically biased and does not accurately reflect the true extent of accumulated labor market experience for women. As others have indicated, this bias can be attributed, in part, to the intermittent labor force participation of women. Thus, human capital earnings functions based on EXP may yield biased and inconsistent estimated returns to experience due to an error-in-variables specification problem (Regan and Oaxaca, 2009). Since direct comparisons of estimated returns using both variables are seldom reported, Table 2 presents such a comparison. The estimated returns to labor market experience are based on a standard semi-logarithmic human capital earnings function with a quadratic experience term.<sup>4</sup> As Table 2 shows, potential labor market experience (EXP) yields counter-intuitive results that are not statistically significant. YRFTEXP, on the other hand, yields robust estimated returns that are consistent with human capital theory. Thus, the annualized returns to female labor market experience, corrected for actual historical information on labor market activity, range between 2.3% to 3.2%.

**Table 2: Estimated Returns to Labor Market Experience for Women – 1979 National Longitudinal Survey of Youth, 1994 and 2010 Samples**

Year/Sample	Variable	Mean	OLS Coefficient	Estimated Return To Labor Market Experience
1994-All Women	EXP	14.56	-0.03564	
	EXPSQ	221.67	0.00141 <sup>b</sup>	<b>0.5%</b>
	YRFTEXP	12.11	0.04894 <sup>a</sup>	
	YRFTEXPSQ	165.96	-0.000712 <sup>b</sup>	<b>3.2%</b>
1994-YRFT Women	EXP	14.38	0.01766	
	EXPSQ	216.81	-0.000430	<b>0.5%</b>
	YRFTEXP	13.26	0.06476 <sup>a</sup>	
	YRFTEXPSQ	191.13	-0.00136 <sup>a</sup>	<b>2.9%</b>
2010-All Women	EXP <sup>c</sup>	21.6	-0.084301	
	EXPSQ	477.4	0.00133	<b>-2.7%</b>
	YRFTEXP	19.1	0.04063 <sup>a</sup>	
	YRFTEXPSQ	404.58	-0.0004343	<b>2.4%</b>
2010-YRFT Women	EXP	21.58	-0.06616	
	EXPSQ	476.61	0.00103	<b>-2.2%</b>
	YRFTEXP	20.12	0.03813 <sup>a</sup>	
	YRFTEXPSQ	439.83	-0.00036937	<b>2.3%</b>

Notes: <sup>a</sup> The OLS coefficient is statistically significant at the 1% level. <sup>b</sup> The OLS coefficient is statistically significant at the 10% level. <sup>c</sup> 'Adjusted' EXP for 2010 = Age – Schooling -13.

<sup>4</sup> The dependent variable is the log of hourly earnings, and the independent variables include: education, mother's education, non-English speaking household during childhood, union status, region of residence, type of residence (urban vs. rural), AFQT percentile, race (nonwhite), and Hispanic origin. The full OLS wage regression results are available from the authors.

#### 4. CONCLUSION

Our empirical results confirm that the widely-used proxy for work experience, known as potential experience, is an upwardly-biased estimate of the actual labor market experience for women. This bias typically occurs for workers who are prone to periods of intermittent labor force activity. We also find that potential experience results in unreliable cross-sectional estimates of the returns to female labor market experience. It appears that longitudinal labor market information is the most effective way to assess the empirical link between on-the-job experience and the earnings potential of female workers.

#### AUTHOR INFORMATION

**Paul E. Gabriel** is a Professor of Economics in the Quinlan School of Business at Loyola University Chicago. His research interests include human capital analysis, and empirical studies of the earnings and employment patterns of women and minorities. E-mail: [pgabrie@luc.edu](mailto:pgabrie@luc.edu) (Corresponding author)

**Susanne Schmitz** is Department Chair and Professor of Economics at Elmhurst College. Her research interests include earnings structures within metropolitan labor markets, and human capital analysis. E-mail: [susans@elmhurst.edu](mailto:susans@elmhurst.edu)

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